

Application No. 10/583,688
Paper Dated: March 23, 2009
In Reply to USPTO Correspondence of December 23, 2009
Attorney Docket No. 1455-061789

AMENDMENTS TO THE DRAWINGS

The attached sheet of drawings includes changes to Fig. 2. This sheet, which includes Fig. 2, replaces the original sheet including Fig. 2.

Attachment: Replacement Sheet
Annotated Sheet Showing Changes

REMARKS

The non-final Office Action dated December 23, 2008 has been reviewed and the Examiner's comments carefully considered. Claims 1-3 are pending in the application and are subject to the enclosed Office Action.

The Applicants would like to thank the Examiner for indicating that claims 2 includes allowable material.

In the Office Action, the Examiner objects to the drawings for failure to comply with 37 C.F.R. § 1.84(p)(4), indicating incorrect reference numerals. Specifically, the Examiner has objected to Figure 2 for showing the transfer pipe and the powder preheating device with incorrect reference numerals. The Examiner is correct, and Figure 2 has been modified to show the proper reference numerals. Accordingly, removal of this objection is respectfully requested.

Claims 1 and 3 stand rejected under 35 U.S.C. §103(a) for obviousness over U.S. Patent No. 6,808,755 to Miyamoto et al. (hereinafter "the Miyamoto patent") in view of U.S. Patent No. 5,302,414 to Alkhimov et al. (hereinafter "the Alkhimov patent"). In view of the following remarks, the Applicant respectfully requests reconsideration of this rejection.

The Miyamoto patent is directed to a thermal spraying apparatus having a passage forming member (1), a heating means (5), and a speed increasing means (7). The heating means (5) melts the coating powder material in the passage of the passage forming member (1) for thermal spraying.

The Miyamoto patent does not teach or suggest several essential elements of the presently claimed invention. The present invention is directed to a cold spray apparatus that includes a powder preheating device. With the aid of the powder preheating device, the cold spray apparatus can efficiently coat the particles without melting the particles as in the Miyamoto patent.

In the thermal spray method of the Miyamoto patent a substrate that is a parent material is roughened by a blasting process and is coated by a mechanical bonding. That is, a powder is melted by the heating means 5 and then is sprayed on the substrate at high velocity. In this manner, the powder is coated on the substrate. The coating powder sprayed by the thermal spraying method is melted in heating means 5, therefore the original structure of the powder may be changed due to the melting of the coating material. The heating means 5 merely plays a role in the heating and melting of the coating powder in the Miyamoto patent.

The original structure of the coating powder is therefore changed due to the melting of the coating material. In addition, as stated in the office action, the Miyamoto patent does not teach or suggest a mixing chamber. Accordingly, the Miyamoto patent does not teach or suggest either a powder preheating device or a mixing chamber.

The Alkhimov patent fails to cure the deficiencies of Miyamoto patent. The Alkhimov patent discloses a conventional cold gas spraying method for applying a coating to an article. The cold spray technique of the Alkhimov patent is capable of coating powders at a low temperature. In the cold spray technique, powder particles are accelerated to a velocity which exceeds a threshold velocity at which a coating material can be coated on a substrate, by using high pressure gases. When the particles strike the target surface, the kinetic energy of the particles is transformed into plastic deformation of the particles, and a bond is formed between the particles and the target surface.

Accordingly, since the cold spray technique of the Alkhimov patent coats the particles in solid state without melting them, it does not teach or suggest a powder preheating device. In addition, a mixing chamber to mix gas and preheated powder is neither taught nor suggested, therefore, claims 1 and 3 are believed to be patentable for the reasons discussed hereinabove. Reconsideration and withdrawal of the rejection of claims 1 and 3 are respectfully requested.

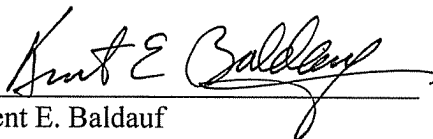
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V. Conclusion

Based on the foregoing amendments and remarks, reconsideration of the rejections and allowance of pending claims 1-3 are respectfully requested. Should the Examiner have any questions or wish to discuss the application in further detail, the Examiner is invited to contact Applicants' undersigned representative by telephone at 412-471-8815.

Respectfully submitted,

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